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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,112	04/14/2005	Shinji Shimosaki	0149-044719	2110

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EXAMINER

ROBINSON, ELIZABETH A

ART UNIT	PAPER NUMBER
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1794

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/502,112	Applicant(s) SHIMOSAKI ET AL.	
	Examiner Elizabeth Robinson	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-30,32,34-36 and 63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-30,32,34-36 and 63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 28-30, 32, 34-36 and 63 are currently pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 4, 2008 has been entered.

Claim Rejections - 35 USC § 102

Claims 28-30, 34 and 63 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsukada et al. (US 2002/0081246).

Regarding claims 28-30, Tsukada (Paragraph 3) teaches a photocatalytic filter material. The base material for the filter (Paragraphs 60-65) can be glass fibers in the form of a fabric. The fibers have protrusions, which can also be glass fibers (Paragraph 67). The base material and protrusions are covered with a photocatalyst (Paragraph 71). The photocatalyst can be anatase titanium dioxide (Paragraph 66). Anatase is a crystalline form of titanium dioxide. The coating film can be formed by vapor deposition

(Paragraph 34). The average diameter of the photocatalyst fine particle is from 5 to 1000 nanometers. This range overlaps the range of the instant claims.

Regarding claim 34, Tsukada (Paragraph 66) teaches that the photocatalyst can be a combination of titanium dioxide and zirconium dioxide.

Regarding claim 63, Tsukada (Paragraph 3) teaches that the filter material is used in environmental purification.

Claim Rejections - 35 USC § 103

Claims 28-30, 32, 34-36 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanaka et al (US 5,919,422), in view of Boire et al (US 6,103,363).

Regarding claims 28-30, Yamanaka (Thirteenth Preferred Embodiment, Column 24, line 52 through Column 28, line 5 and Figures 17 and 18) teaches a photo-catalyzer vehicle curtain. The substrate of the curtain (181) is made from a glass-fiber woven cloth, which is coated with a continuous film (183 and 185) of titanium dioxide (a titanium oxide) photocatalyst (Column 25, lines 3-14). The photocatalyst film can be deposited on the glass fibers by vapor deposition (Column 26, lines 15-30). The photocatalyst can be vapor deposited on the substrate and then the temperature can be raised to calcine and form the photocatalyst layer (Column 26, lines 15-45). Yamanaka (Column 3, lines 9-25) further teaches the substrates on which the coating processes can be used, which include both glass fibers and glass plates. In the Fourteenth Preferred Embodiment (Column 28, lines 53-64), Yamanaka teaches that the process of

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applying the film to the solid substrate (as in the Fourteenth Preferred embodiment), the film thickness, and the physical properties of the photo-catalysts are identical with those of the Thirteenth Preferred Embodiment (glass fiber substrate). Thus, coating solid glass and glass fibers are analogous arts. Yamanaka does not teach the specifics of the vapor deposition process or the crystallite size of the titanium photocatalyst.

Yamanaka (Column 26, lines 15-45) does teach that the photocatalyst has an anatase-type crystalline structure and that the particles should be of sufficiently small diameter (Column 25, lines 45-52), in order to have a high photo-catalytic action. Since Yamanaka does not teach the specifics of the deposition process, one of ordinary skill in the art would be motivated to search out specifics for vapor depositing titanium oxide photocatalysts on glass substrates. As Yamanaka teaches that the methods and characteristics of the coating process for glass and glass fibers are the same, the search for this method would encompass deposition on either type of substrate. Boire (Column 1, lines 49-55) teaches coating a glass substrate with a crystalline titanium oxide photocatalyst. Boire (Column 7, lines 30-52 and Column 8, lines 5-18) teaches the process for vapor deposition to produce the coating. It would be obvious to one of ordinary skill in the art to use the deposition process of Boire, as the process for Yamanaka, in order to have additional specifics on how to vapor deposit a titanium dioxide photocatalyst on a glass substrate. As in Yamanaka, Boire (Column 8, lines 5-18) also teaches a post-deposition heating step to better control the degree of crystallization and crystalline nature of the oxide. Boire (Column 2, lines 5-30) further

teaches that crystallites should have an average size of between 0.5 and 100nm, preferably 1 to 50 nm, in order to have an optimum photocatalytic effect.

Regarding claim 32, Boire (Column 7, lines 30-52) teaches that the vapor deposition can be performed with titanium tetrachloride.

Regarding claim 34, Boire (Column 2, lines 40-67) teaches that a photocatalytic coating can also comprise silicon oxide, zirconium oxide or aluminum oxide, in order to lower the refractive index of the coating, so as to lower the reflection of the substrate. It would be obvious to one of ordinary skill in the art to add another metal oxide to the titanium oxide photocatalyst of Yamanaka, to reduce the refractive index of the coating to minimize reflection from the vehicle curtain.

Regarding claim 35, Boire (Column 3, lines 15-31) teaches that a photocatalytic coating can be doped with a metal oxide, in order to amplify the photocatalytic effect. Many of the listed metals are transition metals. It would be obvious to one of ordinary skill in the art to dope the photocatalytic coating of Yamanaka with a transition metal oxide, as taught by Boire, in order to amplify the photocatalytic effect of the photocatalyst coating.

Regarding claim 36, Yamanaka (column 25, lines 17-22) teaches that the photocatalyst has a light rainbow-like color.

Regarding claim 63, Yamanaka (column 27, lines 53-60) teaches that the photocatalyzer can clean and purify the air.

Response to Arguments

Applicant's arguments filed April 4, 2008 have been fully considered but they are not persuasive.

Applicant argues that the references do not teach a continuous film. Applicant points to the teachings in Yamanaka that teaches coating by the sol-gel method. However, as was stated in the October 4, 2007 Office Action and restated in this Action, the Thirteenth Preferred embodiment also teaches vapor deposition. As stated above, Yamanaka teaches that the glass-fiber woven cloth is coated with a continuous film of titanium dioxide photocatalyst. Applicant has provided no proof or argument that the vapor deposited coating of Yamanaka is not continuous.

Applicant argues that the crystallites of Yamanaka are not inherently sized as in the instant claims and that one of ordinary skill in the art would not have been motivated to use the teachings of Boire to determine optimal crystallite sizes. Since the crystallite sizes of Yamanaka are unknown, the Examiner withdraws the inherency arguments for the crystallite size. However, as stated above, since Yamanaka does not detail the specifics of a vapor deposition process (not the sol-gel process) one of ordinary skill in the art would be motivated to search for the specifics of the process. As Yamanaka teaches that the methods and characteristics of the coating process for glass and glass fibers are the same, the search for this method would encompass deposition on either type of substrate. As stated above, Boire teaches specifics for vapor depositing titanium dioxide photocatalyst on a glass substrate and teaches varying the calcining temperature in order to control crystallization.

Applicant argues that neither reference coats a mass of inorganic fibers.

However, as stated above, the substrate of Yamanaka is a woven glass cloth.

Due to amendments to the claims, the claim objections from the October 4, 2007 Office Action are withdrawn.

Due to amendments to the claims, the claim rejections under 35 U.S.C. 112 from the October 4, 2007 Office Action are withdrawn.

Due to amendments to the claims, the claim rejections under 35 U.S.C. 102(b) from the October 4, 2007 Office Action, using Yamanaka et al. as a standalone reference, are withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Robinson whose telephone number is (571)272-7129. The examiner can normally be reached on Monday- Friday 8 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ear
/E. R./
Examiner, Art Unit 1794

/Carol Chaney/
Supervisory Patent Examiner, Art Unit 1794